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### (54) Method and apparatus for reducing cross talk using line coding

(57) To accommodate the overlay of broadband information over narrowband signals while reducing cross-talk in upstream and downstream directions, different baseband line codes are used to modulate respective upstream and downstream transmissions on a common wireline communication resource, such as a twisted copper-pair. In this way, filtering components located at each end of a connection can reject cross-talk based upon dissimilar signal characteristics that arise between wanted broadband signals having a first baseband line code and spectrally-shifted cross-talk emanating from interfering broadband signals having a different baseband line code.

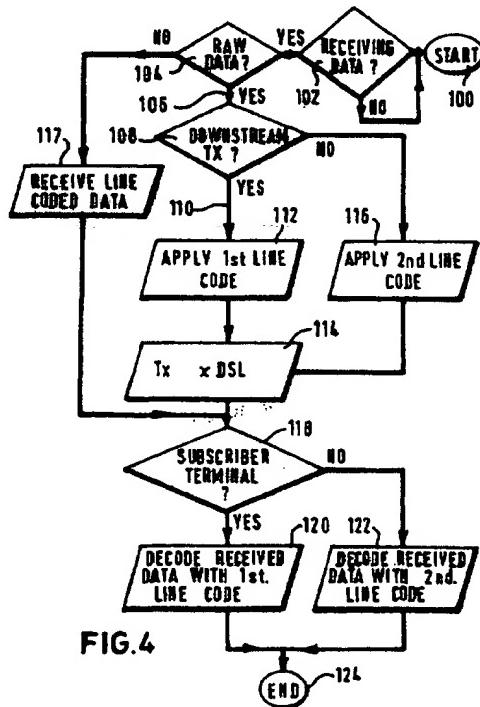


FIG.4



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## EUROPEAN SEARCH REPORT

Application Number

EP 98 30 9092

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 680 394 A (TONG PO ET AL) 21 October 1997 (1997-10-21) * abstract; claims 1,5,6,11-13,20; figure 6 * * column 1, line 39 - line 61 * * column 2, line 9 - line 26 * * column 3, line 8 - line 21 * * column 3, line 28 - line 35 * * column 5, line 24 - line 44 * * column 7, line 43 - line 67 * * column 8, line 48 - column 9, line 11 * --- X US 5 515 378 A (OTTERSTEN BJORN ET AL) 7 May 1996 (1996-05-07) * column 1, line 18 - line 47 * * column 7, line 27 - line 32 * * column 9, line 15 - line 31 * * column 9, line 43 - column 10, line 10 * * column 24, line 62 - column 25, line 7; claims 3,4,7 * --- X WO 97 06619 A (TELIA AB ;ISAKSSON MIKAEL (SE)) 20 February 1997 (1997-02-20) * abstract; claims 1,2,4,7 * * page 1, line 10 - line 19 * * page 2, line 28 - line 38 * * page 3, line 25 - line 32 * * page 4, line 27 - line 30 * * page 6, line 2 - line 11 * * page 6, line 31 - page 7, line 7 * --- -/--	1-30	H04L5/02
	The present search report has been drawn up for all claims		TECHNICAL FIELDS SEARCHED (Int.Cl.6)  H04L
	Place of search  BERLIN	Date of completion of the search  15 August 2001	Examiner  Binger, B
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
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## EUROPEAN SEARCH REPORT

Application Number  
EP 98 30 9092

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB 2 311 196 A (NORTHERN TELECOM LTD) 17 September 1997 (1997-09-17) * abstract; claims 1-3,5,7; figure 3 * * page 1, line 11 - page 2, line 9 * * page 3, line 20 - page 4, line 16 * * page 5, line 31 - page 6, line 11 * * page 7, line 17 - line 33 * * page 9, line 1 - line 10 * -----	1-30	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
	The present search report has been drawn up for all claims		
Place of search	Date of completion of the search	Examiner	
BERLIN	15 August 2001	Binger, B	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons -----           & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 9092

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-08-2001

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 5680394	A	21-10-1997	AU	720576 B	08-06-2000
			AU	6478296 A	10-02-1997
			CN	1190511 A	12-08-1998
			EP	0838109 A	29-04-1998
			JP	11509062 T	03-08-1999
			WO	9703506 A	30-01-1997
			US	5838667 A	17-11-1998
<hr/>					
US 5515378	A	07-05-1996	AT	183865 T	15-09-1999
			AU	670766 B	01-08-1996
			AU	3145493 A	19-07-1993
			CA	2125571 A	24-06-1993
			DE	69229876 D	30-09-1999
			DE	69229876 T	30-12-1999
			EP	0616742 A	28-09-1994
			EP	0926916 A	30-06-1999
			ES	2137197 T	16-12-1999
			FI	942771 A	10-06-1994
			JP	7505017 T	01-06-1995
			WO	9312590 A	24-06-1993
			WO	9818272 A	30-04-1998
			US	5546090 A	13-08-1996
			US	5625880 A	29-04-1997
			US	5592490 A	07-01-1997
			US	5642353 A	24-06-1997
			US	5828658 A	27-10-1998
<hr/>					
WO 9706619	A	20-02-1997	EP	0883944 A	16-12-1998
			SE	9502775 A	05-02-1997
<hr/>					
GB 2311196	A	17-09-1997	EP	0886926 A	30-12-1998
			WO	9735399 A	25-09-1997
			JP	2000512443 T	19-09-2000
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